



FIBER[®]
D R I V E R

EM316E3

EM316E3SF

**E3 Fiber Modem
Fiber Driver Module**

User's Guide

Registration Card

Your name: Mr./Ms _____
Organization: _____ Dept. _____
Your title at organization: _____
Telephone: _____ Fax: _____
Organization's full address: _____

Country: _____
Date of purchase (Month/Day/Year): _____

Serial number:

Product was purchased from:
Reseller's name: _____
Telephone: _____ Fax: _____
Reseller's
full address _____

Answers to the following questions help us to support your product:

- 1. Where and how will the product primarily be used?**
 Home Office Travel Company Business Home Business Personal Use
- 2. How many employees work at installation site?**
 1 employee 2-9 10-49 50-99 100-499 500-999 1000+
- 3. What network medium/media does your organization use ?**
 Fiber-optics Thick coax Ethernet Thin coax Ethernet
 10BASE-T UTP/STP 100BASE-TX 100BASE-T4 100VGAnyLAN
 Others _____
- 4. What category best describes your company?**
 Aerospace Engineering Education Finance Hospital
 Legal Insurance/Real Estate Manufacturing
 Retail/Chain store/Wholesale Government
 Transportation/Utilities/Communication VAR System house/company
 Other _____
- 5. Would you recommend your Fiber Driver product to a friend?**
 Yes No Don't know yet





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1 INTRODUCTION

About this Manual

Before unpacking please refer to section 2 (Hardware Installation)

This manual is a guide to the installation and operation of the EM316E3 Fiber modem.

Product description describes the product, its functions, features, protocol supported, minimum requirements, and typical applications.

Customer support provides information on return policy and customer support information.

Glossary provides definition to terms used in this manual.

Product Description

The EM316E3 modules of the Fiber Driver Family are Fiber Modems designed to convert a E3 interface into high-speed fiber optic interface, thus enabling the extension of the E3 maximum spanning distance up to fiber optic distance limit. These units convert the electrical signals from a coax cable to optical signals and transmit them over distances of up to 7km on multimode fiber, or distances of up to 100km on singlemode fiber. The EM316E3 supports ITU-T G.703, ITU-T G.823, and HDB3 line codes.

The EM316E3SF Fiber Driver's single fiber modules use unique technology that provides the ability to combine TX and RX signals onto a single fiber strand. This effectively doubles the available fiber in a network and eliminates the need for additional fiber connections. An identical EM316E3SF unit is required on the other end, using either standard APC (Angled PC) patch cords finish or a 3M VAR APC finish. The standard APC finish provides a <60dB back reflection, whereas the 3M VAR exceeds -70dB. Both APC finishes are polished to an 8° angle and minimize back reflection by forcing the reflected rays into the cladding.

The Fiber Driver family provides conversion solutions with greater distances and better manageability than any other products on the market. Multimode to Single Mode fiber conversion modules offers link distances from 0 km to 100 km.

Features

- E3 conversion between coax media and fiber media
- Supports ITU-T G.703, ITU-T G.823, and HDB3 standards
- Supports Local, Remote and Line Loop back Test
- Up to 100km Transmission on Single Mode or 7km on Multimode Fiber
- Modules can be Inserted / Removed without powering off the chassis
- Extensive Network Management Support when used with EM316NM

*For dB budget see: <ftp://ftp.fiberdriver.com/pub/doc/spec/fiberdriver>

Requirements for Managed Module

EM316NM Management Firmware version 4.0 or later

For firmware released version go to:

<ftp://ftp.fiberdriver.com/pub/software/em316nm>

For firmware beta version go to:

<ftp://ftp.fiberdriver.com/pub/software/beta/em316nm>

MegaVision Network Management version 1.20 or later

Connectivity

Connectors Used

Coax: 75 Ω BNC (2 connectors: 1 for TX, 1 for RX)

Fiber: SC, or SC-APC (for single fiber)

Cable Requirement

Coax: RG58/U (Max Length=900 feet)

Fiber: SC-SC fiber cable, or SC-APC fiber cable (for single fiber)

Port Description

Port# Port Description

Port 1 E3 Coax, Conforms to ITU-T G.703, ITU-T G.823, and HDB3 standards

Port 2 E3 Fiber, Multi-Mode: 1310nm, 0-2km

Multi-Mode: 1310nm, 2-7km

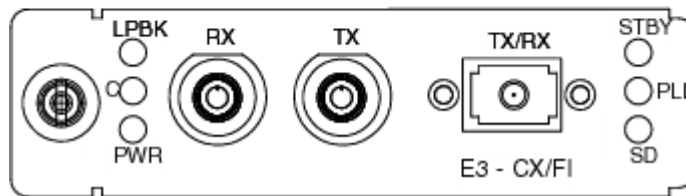
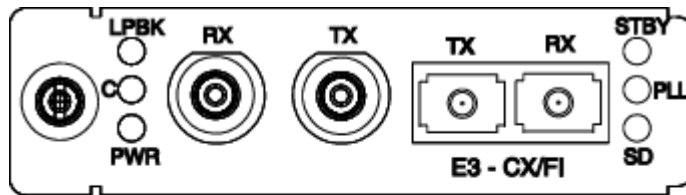
Single Mode: 1310nm, 0-25km

Single Mode: 1310nm, 25-50km

Single Mode: 1550nm, 50-100km

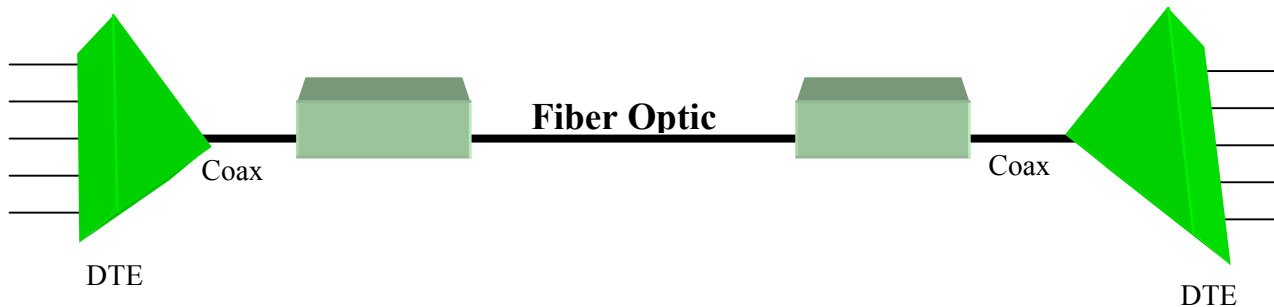
Display Information (LED Definition)

- PWR: illuminates when unit is powered (green color)
- LPBK: illuminates (yellow color) when local loop back on both interfaces is enabled, OFF (no light or green color) when in normal mode
- C: illuminates when E3 (coax) interface detected a signal above threshold level
- SD: illuminates when Fiber Optic interface detected a signal above threshold level
- PLL: illuminates when phase lock loop (PLL) detected enough transition for locking; (ACT was changed to PLL on the Panel)
- STBY: illuminates (yellow color) when Fiber Optic link is transmitting an idle signal because E3 (coax) signal is absent, OFF (no light) when in normal mode



Typical Applications

EM316E3 (E3 Coax To E3 Fiber Multimode or Singlemode)



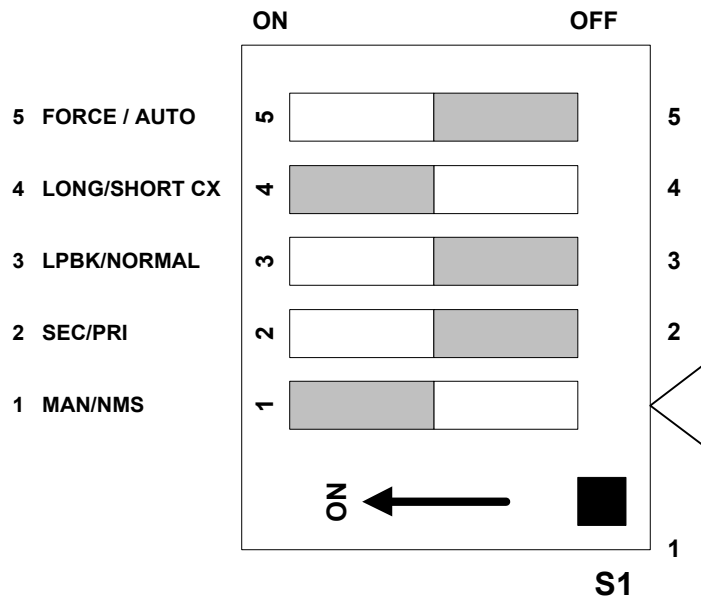
Configuration

Jumper Settings: (Factory Default)

CONFIGURING THE SWITCH (S1)		
SWITCH	SETTINGS	RESULTS
MAN/NMS	*ON	Force switches selections (loop back) regardless of NMS command
	OFF	Default setting comes from switches after power up, but maybe change by NMS commands
SEC/PRI	ON/OFF	Not used in this application. Reserved for the dual-redundant card. Setting is irrelevant to the card
LPBK/NORMAL	ON	Loop back mode enabled
	OFF	Normal mode enabled
LONG/SHORT	*ON	Cable length is longer than 250 feet
	OFF	Cable length is shorter than 250 feet
SW5	ON/OFF	Setting is irrelevant to this card at this time

Note: LONG/SHORT settings shown above are the recommended setup, but can be change to other polarity if better results/performance can be achieved.

Default Setup: MAN/NMS, LONG/SHORT: ON. All other switches: OFF



IMPORTANT NOTICE

The jumper settings shown above should be use only on expansion modules that has printed circuit board assembly (PCBA) number: 1226062-007 or later. This number can be found on a white bar coded label located at the bottom side of the expansion module.

Theory of Operation

Block diagram of the Modem/Converter is shown below (fig. 1)

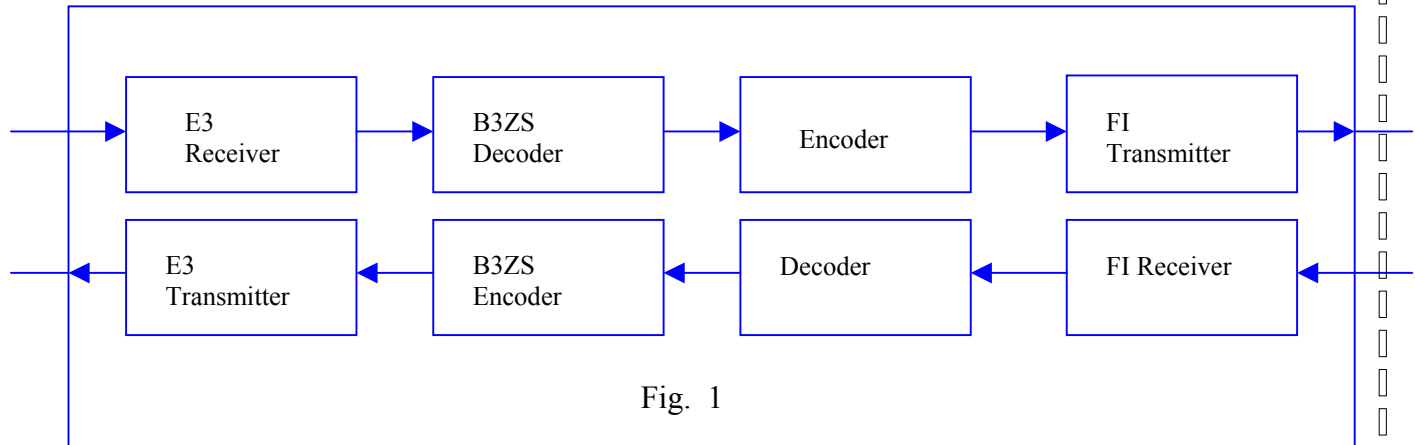


Fig. 1

E3 Line Receiver to fiber optic Transmitter:

The receiver Line Interface Unit (LIU) receives the E3 signal and performs clock recovery and data detection. The data goes through B3ZS Decoding Block to extract NRZ data. It then goes to an encoding block and is ready to be transmitted by the Fiber Optic Transmitter Interface.

Fiber optic Receiver to E3 Transmitter:

The fiber optic Receiver Interface directs the received signal to a decoder in order to extract the NRZ data. The NRZ data is going through B3ZS encoder and then to the E3 Transmitter.

Loop Back:

This feature isolates the optic side from the E3 side, and enables each side to loop back on its own media line as shown below:

Switch LPBK/NORM is set to ON

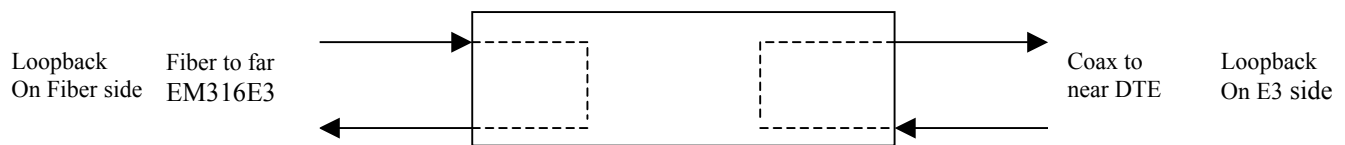


Fig. 2

When switch LPBK/NORMAL is turned ON, the card is configured as follows:

Optic input to the receiver is looped back into optic transmitter, thus enabling remote site to perform loop back on fiber optics. Note that this loop back includes the encoder and decoder blocks of the fiber optic. E3 receiver input is looped back into E3 transmitter, thus enabling full loop back on E3 line side. The route of the loop back includes the logic of decoder and encoder blocks of the E3.

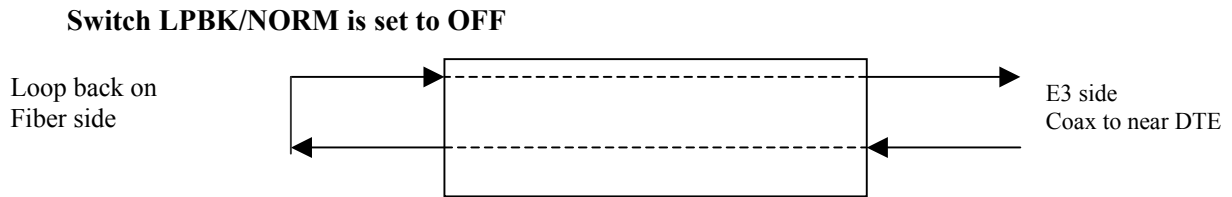


Fig. 3a: External loop back on fiber optic

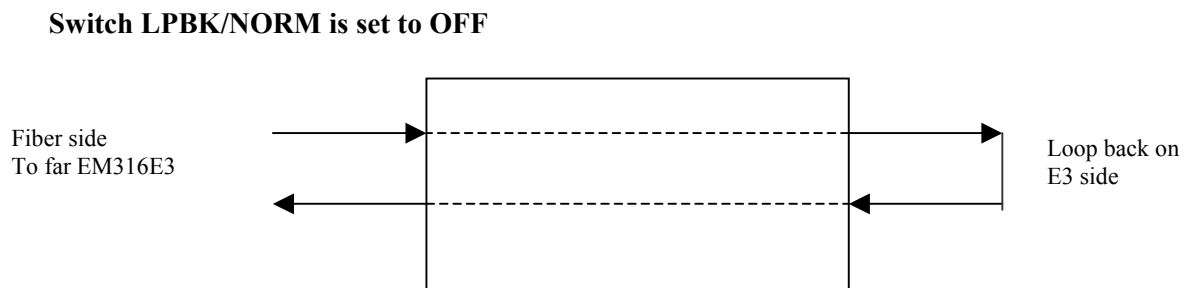


Fig. 3b: External loop back on fiber optic

Loop Back Control: By NMS command or manually by a switch

Loop back can be forced regardless of management by turning switch 1 MAN/NMS to ON and switch 3 NORM/LPBK to ON.

NOTE: It is also possible to configure an external loop, either on E3 side or the fiber side, the switch LPBK/NORMAL should remain in NORM position since the card is in its Normal mode. For external Fiber optic loop back, connect a fiber between RX SC connector and TX SC connector see (fig 3a). For external E3 loop back connect a coax cable between RX BNC connector to TX BNC connector (fig 3b)

2 HARDWARE INSTALLATION

PREPARATION

STEP 1 Follow all Safety Regulations

- 1 Eliminate static electricity in the workplace by grounding operators, equipment, and devices (components and computer boards). Grounding prevents static charge buildup and electrostatic potential differences. Transporting products in special electrostatic shielding packages avert electrical field damage.

- 2 An effective workplace should be outfitted with the following items:
 - a) ESD protective clothing/smocks: Street clothing must not come in contact with components or computer boards since the various materials in clothing can generate high static charges. ESD protective smocks, manufactured with conductive fibers, are recommended.

 - b) Electrostatic shielding containers or totes: These containers (bags, boxes, etc.) are made of specially formulated materials, which protect sensitive devices during transport and storage.

 - c) Antistatic or dissipative carriers: These provide ESD protection during component movement in the manufacturing process. It must be noted that antistatic materials alone will not provide complete protection. They must be used in conjunction with other methods such as totes or electrostatic shielding bags.

 - d) Dissipative tablemat: The mat should provide a controlled discharge of static voltages and must be grounded. The surface resistance is designed such that sliding a computer board or component across its surface will not generate more than 100 V.

 - e) Personal grounding: A wrist strap or ESD cuff is kept in constant contact with bare skin and has a cable for attaching it to the ESD ground. The purpose of the wrist strap is to drain off the operator's static charge. The wrist strap cord has a current-limiting resistor for personnel safety. Wrist straps must be tested frequently to ensure that they are undamaged and operating correctly. When a wrist strap is impractical, special heel straps or shoes can be used. These items are effective only when used in conjunction with a dissipative floor.

- f) ESD protective floor or mat: The mat must be grounded through a current-limiting resistor. The floor or mat dissipates the static charge of personnel approaching the workbench. Special conductive tile or floor treatment can be used when mats are not practical or cause a safety hazard. Chairs should be conductive or grounded with a drag chain to the flooring.

STEP 2 Determine the best location for the chassis.

Affix the chassis to a 19" or 23" rack using the enclosed rack mount ears, or place the unit on a secure, flat surface. Ensure that the unit is within reach of the necessary connections (i.e. power outlet, Ethernet connections, and, if the chassis will be monitored via serial port, and either a PC, UNIX workstation, or modem).

STEP 3 Make sure there is enough space to pull and connect both the electrical and optical cables without stressing them beyond the manufacturer's limitation (bend radius minimum).

STEP 4 Plug in the chassis

Connect the power cord (s) to the chassis and an outlet. Turn the power switch (es) to ON position. The wide-ranging power supply adjusts to any outlet.

STEP 5 Unpacking the unit

Verify that no visible damage has been caused to the outer box. Remove all material from the packing box and confirm receipt of the following:

Fiber Driver module unit
User's manual (this manual in printed format or on a CD)

In the unlikely event that anything is missing, contact your authorized dealer or representative. If it becomes necessary to return the unit, repackage the unit in its original box.

UNIT INSTALLATION

STEP 1 Remove required amount of blank panels from the NC316BU-xx.

NOTE: Per FCC regulations, either a panel or a module should **always** cover chassis slots.

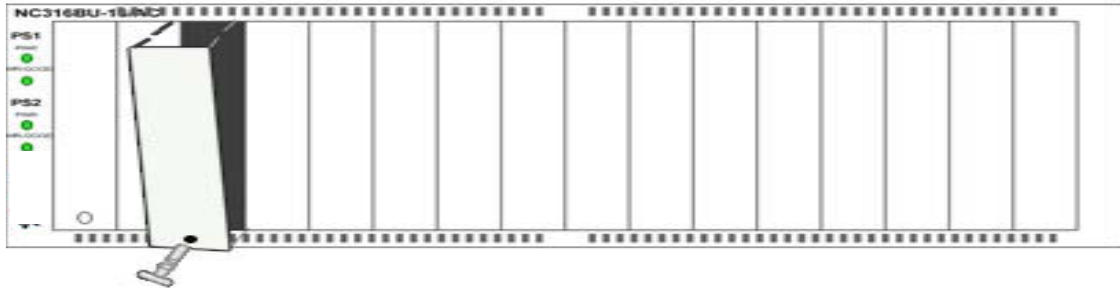


FIGURE 1.1 Take out the required amount of blank panels.

STEP 2 Align the edges of the EM316 module to the rail inside the chassis, see pictures below.

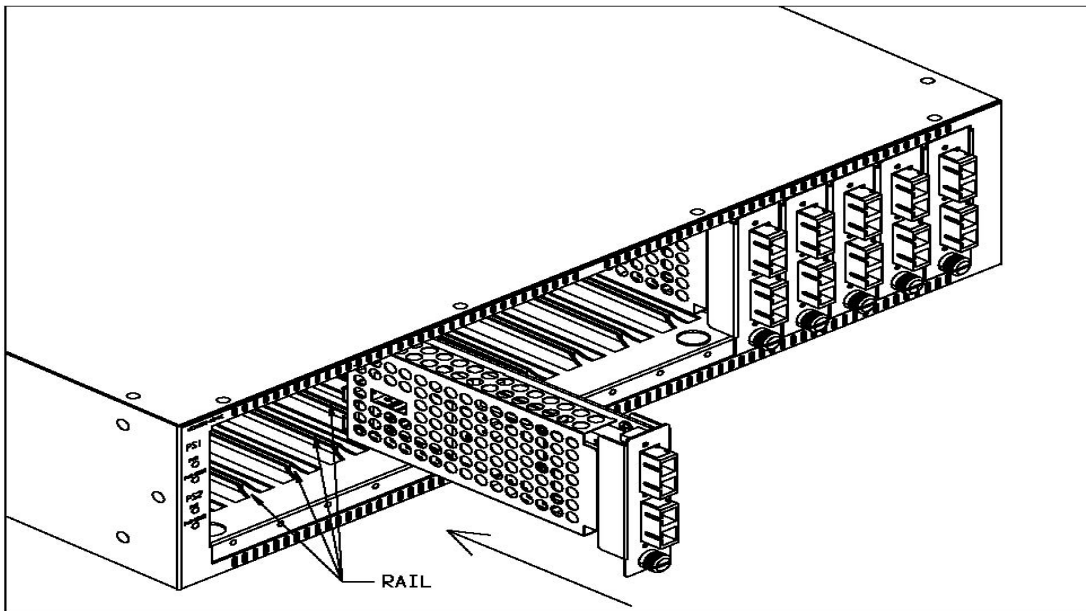


FIGURE 1.2 Align the edges of the EM316 to the rail inside the chassis and then insert the unit.

STEP 3 Insert the module into the NC316BU-xx unit

NOTE: To avoid damaging any components on the module, handle it by the edges, using your thumb to push it securely inside the chassis. Do not use excessive force, but make sure the module is fully inserted in the chassis. When the module is correctly inserted, the **PWR LED should illuminate**.

STEP 4 Secure the module to the unit, using the screws on the front panel.

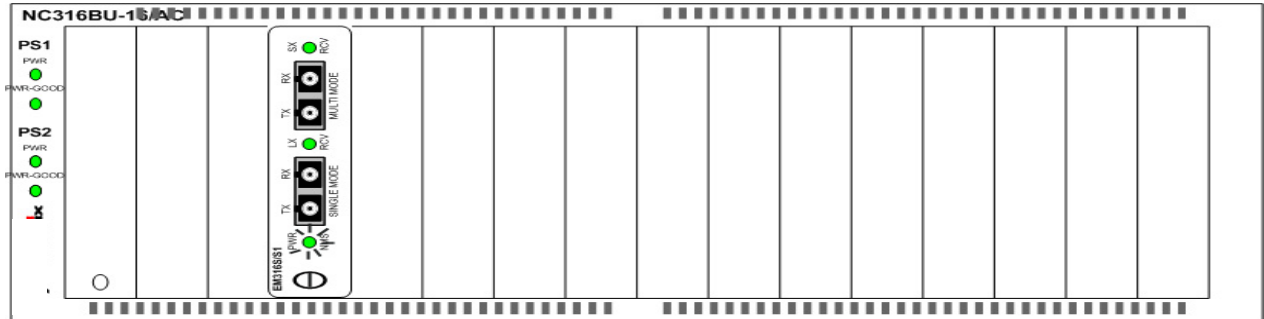


FIGURE 1.3 When the module is correctly inserted, the PWR LED should illuminate.

WARNING! Fiber optic equipment can emit laser or infrared light that might injure your eyes. Never look into an optical fiber or connector port. Always assume that fiber optic cables are connected to a light source.

3 TROUBLESHOOTING

The Fiber Driver series are highly reliable units. If there are any operating problems, the fault probably lies in some other aspect of the configuration. However, if after following the troubleshooting steps below (in order), you find that the unit is still not functioning correctly, please contact your local representative.

Review all link LEDs to ensure that those ports you believe should be functioning are properly attached to a cable.

Verify the correct fiber optic cables are being used, i.e. multi-mode or single mode.

Review all link LEDs to ensure that those ports you believe should be functioning are properly configured.

If the suspect ports are not configured properly, re-configure the port through SNMP management or the Administrative Interface.

Ensure that the equipment attached to this module is configured properly.

Verify that the output power of the fiber optic port(s) is within manufacturer's specification for output power, for more information please see the link below:

<ftp://ftp.fiberdriver.com/pub/doc/spec/fiberdriver>

Verify that the dB loss of the Fiber cable you are connecting to is within the dB budget for this module, for more information please see the link below:

<ftp://ftp.fiberdriver.com/pub/doc/spec/fiberdriver>

4 TECHNICAL SPECIFICATIONS

Electrical
5VDC @ 2 Amps Max
Hot Swappable

Operating Temperature Range
0°C - +50 °C (32°F – 122°F)

Storage temp
-10°C - +60°C (14°F – 140°F)

Relative Humidity
85% maximum non-condensing

Emissions Compliance
FCC Part 15, Subpart B, 1999 Class A
CE Mark
EN 50081-1: 1992
EN 50082-1: 1997
EN 55024: 1998
EN 55022: 1998
AS/NZS 3548: 1995

Physical Dimensions
1” high x 3” wide x 7” deep (2.54cm x 7.62cm x 12.78cm)

Weight
9.6 oz (0.36 kg)

Color
Black

5 CUSTOMER SUPPORT

Contact Information

If you have any questions, please do not hesitate to contact us at:

Americas Support

MRV (East Coast USA)
295 Foster Street
Littleton, MA 01460-2016
Tech Support: (800) 338-5316
Tech Support: (978) 952-4700
E-mail: support@fiberdriver.com
Fax: (978) 952-4880
URL: <http://www.fiberdriver.com>

MRV (West Coast USA)
20415 Nordhoff St.
Chatsworth, CA 91311
Tel. (800) 338-5316
Tel. (818) 773-0900

International Support

MRV International
Business Park Moerfelden
Waldeckerstrasse 13
64546 Moerfelden – Walldorf
Germany
Tel. (49) 6105/2070
Fax (49) 6105/207-100

Manual Information

The most recent version of this manual may be found on our ftp site:

<ftp://ftp.fiberdriver.com/pub/doc/manuals/>

5 GLOSSARY

Complete definition of networking terms (jargon) used in this manual, may be found on our ftp site:

<ftp://ftp.fiberdriver.com/pub/doc/Glossary.pdf>

6 ORDERING INFORMATION

Please visit us at <http://www.fiberdriver.com> for the latest updates on our products.

Fiber Driver Division of MRV

Chatsworth, CA 91311

Phone: (818) 772-6235 or (800) 966-4444

Fax: (818) 772-0576

Fiber Driver Inquiries: info@fiberdriver.com

Marketing: marketing@fiberdriver.com

Repair Services: rma@fiberdriver.com

*Note: For dB budget see: <ftp://ftp.fiberdriver.com/pub/doc/spec/fiberdriver>

Place
Stamp
Here

8928 Fullbright Avenue
Chatsworth, California 91311
U.S.A.

